

Astragalus ghouchanensis (Fabaceae), a new species from Iran

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Astragalus ghouchanensis Souzani, Zarre & Maassoumi (Fabaceae) is described and illustrated as a new species from Iran. It is compared with some similar species in *Astragalus* sect. *Dissitiflora*. Some notes are given on the affinities of sect. *Dissitiflora* and sect. *Erioceras*.

Key words: *Astragalus*, Fabaceae, morphology, new species, taxonomy

As the largest genus of flowering plants with about 3000 species, *Astragalus* (Fabaceae : Papilionoideae) has one of its main centers of diversity in Iran, where it includes over 800 species (Maassoumi 2005). The species are classified in about 250 sections based on several morphological characters, such as type of indumentum, fruit shape and structure, calyx shape, and petal characteristics. Among the sections, sect. *Dissitiflora* is characterized by medifixed hairs, elongated fruits, as well as by developed stems and internodes. It contains about 20 species in Iran (Ghahreman *et al.* 1996, Maassoumi 2005) and 40 species worldwide, with the second distribution center in Middle Asia. The last taxonomic revision on this section including only the Iranian representatives was by Ghahreman *et al.* (1996) who provided a diagnostic key and some notes on the distribution of the species and affinities among them. A few species have recently

been added to this section in Iran (Maassoumi *et al.* 2000, Zarre *et al.* 2005).

Working towards the fourth volume of *Astragalus* for *Flora Iranica* including species with medifixed hairs, we found a new species with characteristic features of sect. *Dissitiflora*. The most important difference between the new species and the morphologically similar taxa is in its spreading-hairy pods, while most other species of the section have appressed-hairy pods.

Astragalus ghouchanensis Souzani, Zarre & Maassoumi, *sp. nova* (Fig. 1)

Valde affinis *A. viridi* sed differt leguminibus 20–40 mm longis umbellatum congestis (nec ad 20 mm longis remote racemosis), ab *A. sumbari* differt leguminibus patule pilosis, ad 40 mm longis (nec appresse pilosis, 40–60 mm longis)

et stipulis 3–6 mm (nec ad 2.5 mm) longis, ab A. alamliepsi planta 15–40 cm (nec ad 10 cm) alta, stipulis 3–6 mm (nec ad 2 mm) longis, leguminibus 20–40 mm (nec ad 12 mm) longis.

TYPE: Iran. Prov. Khorasan, Ghouchan to Neyshabour, before Chakan-e, Borselan, 3 km after Borselan to Golmokharan, margins of farms, hills of the left road, 1664 m, 24.VI.2007 *Souzani* 35929 (holotype TUH; isotypes FUMH, TARI).

ETYMOLOGY. The epithet refers to the city of Ghouchan, a relatively large and important city in northeast Iran.

Perennial herbaceous plants with woody base and remainders of last years' rachides, 15–40 cm tall, strongly branched. Stems of current year 5–15 cm long, erect, densely furnished with appressed, symmetrical to few asymmetrical white hairs, sometimes mixed with spreading black hairs. Stipules membranous, brownish, 3–6 mm long, free portion triangular to lanceolate, adnate to petiole for up to 1.5 mm, densely white appressed-hairy at abaxial surface, often with few black hairs at base. Leaves 3–6 cm long; petiole 1–2 cm long, densely white appressed-hairy, sometimes mixed with some spreading black hairs. Leaflets 3–8 pairs, greenish, narrowly elliptic to linear, 8–17 × 1.5–2 mm, acute, both surfaces ± densely appressed-hairy. Peduncle (3.5–)5.5–12 cm long, hairy like stem, gradually becoming spreading-hairy. Raceme dense, 3–10-flowered, covered with subappressed to erect, asymmetrical white and black hairs. Bracts membranous, brownish, triangular to ovate-lanceolate, 2–4 mm long, hairy as racemes. Calyx tubular, 13–16 mm long, gibbous at base, densely covered with erect, simple white hairs 1.5–2 mm long as well as some simple short bifurcate black hairs; teeth subulate, 3–4 mm long. Corolla yellow, flushed with violet at margins and apex. Standard 20–22 mm long; limb obovate, 15–16 mm wide, slightly emarginate, scarcely constricted below middle, subangularly passing into a narrowly cuneate claw. Wings 19–22 mm long; limbs narrowly oblong, rounded to slightly obliquely emarginate, 7–8 × 4 mm; auricle ca. 1 mm long. Keel 18–20 mm long; limbs obliquely obovate, with widely curved lower edge and slightly concave upper edge, subacute, 7–9 × 2.5–3.5 mm; auricle short. Stamen-tube truncate at mouth. Ovary shortly



Fig. 1. *Astragalus ghouchanensis* (from the holotype). — A: Plant habit. — S: Standard. — K: Keel. — W: Wing.

stipitate, linear, with white and black hairs, style hairy at base. Pods bilocular, sessile, erect to pendulous, straight, (20–)25–40 mm long, 2.5–3 mm high, 2–3 mm wide, keeled ventrally; valves pale brownish or yellow, covered with densely spreading, asymmetrical black and white hairs up to 2 mm long, mixed with subappressed hairs, up to 1 mm long. Seeds 4–5 in each locule, rectangular, dark greenish or brown, with blackish dots. Flowering May–June, fruiting June.

Astragalus ghouchanensis was collected from a semi-arid subalpine area with a typical steppe and xerophytic vegetation. It is closely similar especially to *A. viridis* (Table 1), known

Table 1. Comparison of *A. ghouchanensis* with morphologically similar species in sect. *Dissitiflori*.

Character	<i>A. ghouchanensis</i>	<i>A. viridis</i>	<i>A. sumbari</i>	<i>A. alamliensis</i>
Stipule size (mm)	3–6	(3–)5–7	2–2.5	1.5–2(–2.5)
Inflorescence	densely subumbellate	remotely flowered raceme	remotely flowered raceme	capitate to ovoid raceme
Fruit length (mm)	20–40	15–20	40–60	10–12
Fruit shape	linear	ellipsoid	linear	ellipsoid
Fruit indumentums hairs	spreading	spreading	appressed	spreading
Length of calyx and pod hairs	up to 2 mm	up to 3 mm	up to 1 mm	up to 1 mm

from northwest Iran and adjacent countries, i.e. Turkey, Armenia and Azerbaijan. The most important diagnostic characters for separating the new species from the latter is in the shape and size of the fruits, which are linear and longer than 20 mm in *A. ghouchanensis*, but narrowly ellipsoid and shorter than 20 mm in *A. viridis*. Moreover, the pods are 5–6 mm high in the latter, but only 2.5–3 mm in *A. ghouchanensis*. The new species occurs sympatrically with *A. sumbari*, another species placed in sect. *Dissitiflori*. However, the size and orientation of pod hairs, considered to be very important in defining taxa and even phylogeny of *Astragalus* (Zarre 2003, Ghahremani-nejad 2004), are different in these species. The pod hairs are appressed and up to 1 mm long in *A. sumbari*, but up to 2 mm and spreading in *A. ghouchanensis*. Based on the type of fruit indumentum *A. ghouchanensis* can be compared with the species of sect. *Erioceras*, such as *A. djenarensis*, occurring in the same area as *A. ghouchanensis*. However, the hairs are much longer and denser among the members of sect. *Erioceras*. The distinctions between these sections are still not sharply defined and only few species have so far been included in molecular systematic studies (Kazempour Osaloo et al. 2003, 2005). Based on the micro-morphological study conducted by Ghahremani-nejad (2004) these sections belong to two different, but closely related natural groups.

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